

# Power System Study/ Engineering Services

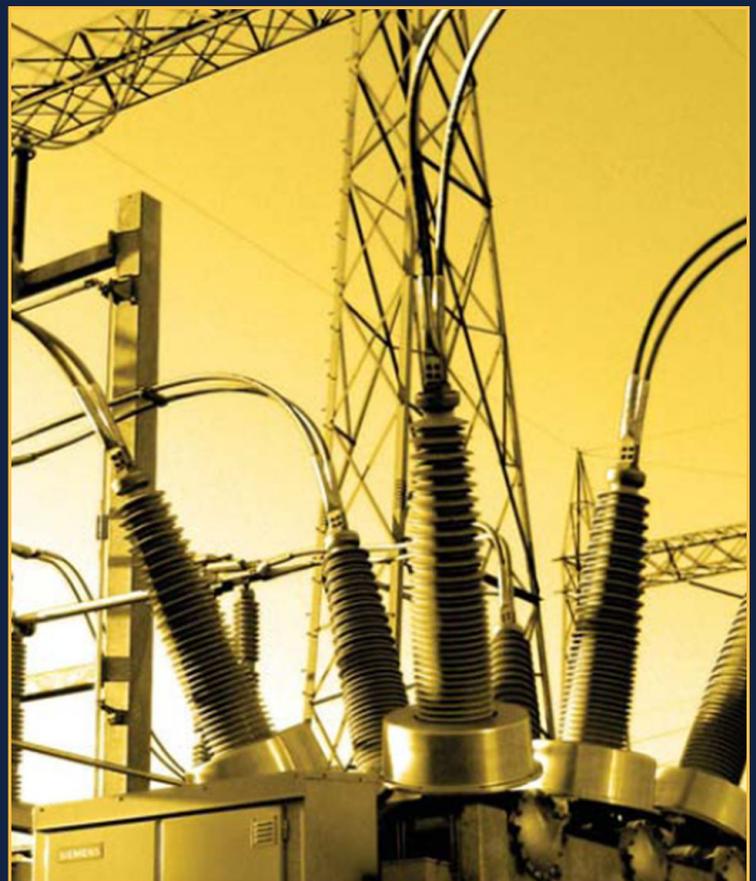


## FIC Engineers

- Load flow studies
- Short circuit studies
- Motor starting studies (Static & Dynamic)
- Equipment protection applications (Transformers, transmission lines, motors, generators, bus protection)
- Protection Coordination Studies (Overcurrent phase and earth fault, high set, differential, distance, frequency, voltage relays)
- Arc Flash Studies
- Harmonic measurements, analysis, and filter design
- Transient stability studies
- Insulation coordination studies

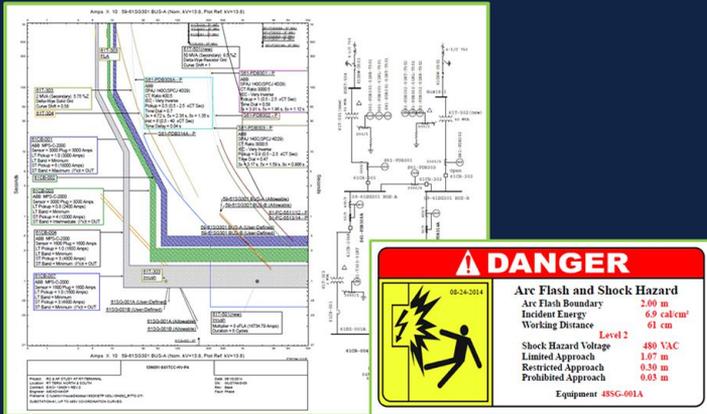
FIC Engineers offer full range of power systems studies and engineering services to utilities, IPP's & Industries - both for new installations and to improve the efficiency and performance of existing Electrical Network. FIC Engineers understands utility/industrial Power System Study requirements with respect to International practices/standards and use state-of-the art software to analyse the system problems in detail to provide techno-economic solutions.

Our success is based on our well proficient and dedicated design team, high-tech design software tools and close interaction with site team during execution and utility engineers for real time feedback.



# Important Reference Projects

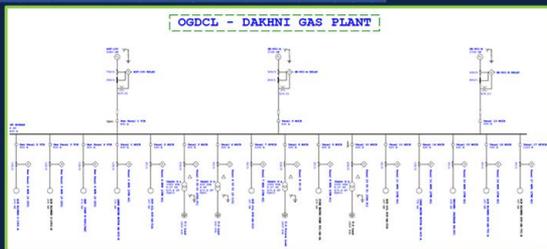
## Relay Coordination and Arc Flash for Saudi ARAMCO



The objective of this study is to verify and validate the over current settings applied in the existing electrical power systems at substations for the safety of personnel and equipment at rastanura south and north terminals. detailed scope of this relay co-ordination study is to update the applied settings in to etap model, generate tcc curves, verify and validate the settings applied. the purpose of the arc flash study is to fix, verify, define and validate the personnel safety requirements along with equipment protection requirements.

## OGDCL Relay Coordination Studies

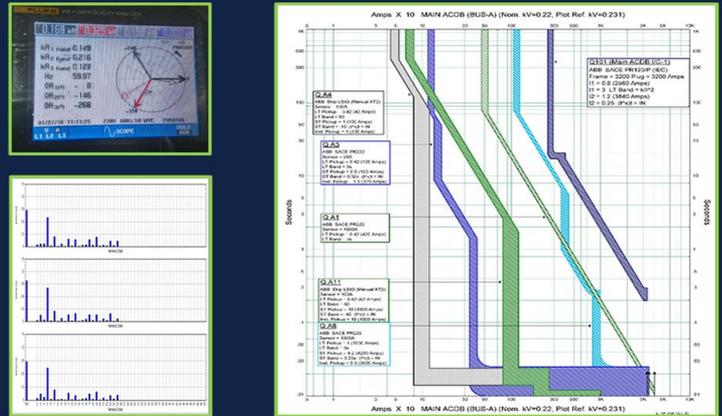
Sr. No.	Description	CT	kW	FLA	SF	LRC	Starting Time	I <sub>sc</sub>	Ke	Te1	Te2	Tr
1	Reconditioning Package PA-501	50/5	336	38.04	1	190.2	<7 sec	0.84	3	4	4	5
2	Air Blower(SRU) GB-701A	30/5	187	23	1	115.0	<7 sec	0.84	3	3	3	5
3	Air Blower(SRU) GB-701B	30/5	187	23	1	115.0	<7 sec	0.84	3	3	3	5
4	Lean Amine Pump GA-403-A	100/5	755	89	1.15	311.5	<18 sec	1.11	3	2	2	5
5	Lean Amine Pump GA-403-B	100/5	755	89	1.15	311.5	<18 sec	1.11	3	2	2	5
6	Hot Oil Pump 830-GA-01A	30/5	187	21.5	1.15	107.5	<6 sec	0.89	3	2	2	5
7	Hot Oil Pump 830-GA-01B	30/5	187	21.5	1.15	107.5	<6 sec	0.89	3	2	2	5
8	Hot Oil Pump 830-GA-01C	30/5	187	21.5	1.15	107.5	<6 sec	0.89	3	2	2	5
9	Fire Water Pump 901-GA-01A	30/5	220	24.91	1.15	124.5	<4 sec	1.04	3	1	1	5



The existing electrical protection system of the Dakhni Gas Plant has performed its function more than 25 years. During the up-gradation of Ruston Gas Turbines new control and protection system was installed which is more advance and responds more quickly/accurately in sensing the faults than the already installed electro-mechanical protection relays. Scope of the study:

- Identify coordination issues and propose solutions
- Protection Settings & Coordination

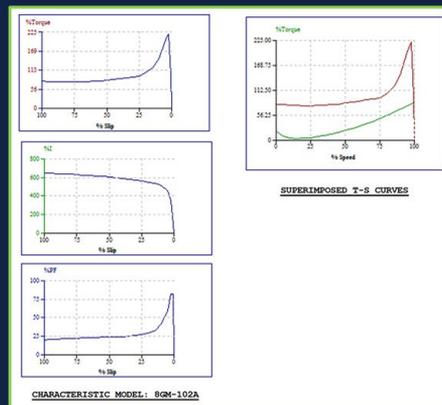
## Trouble Shoot Studies for Saudi Electric



National Grid Telecommunications Control Center (NGTCC) facing frequent tripping issues mostly at the incomer of Main ACDB. Complete analysis & rectification study was performed at the CRTCC building. It was discovered that following are the main issues with the Electrical network:

- Voltage Settings Coordination
- Current Settings Coordination
- Harmonics distortions
- Current unbalancing
- ATS Malfunctioning
- Single 13.8kV feeder
- Error in ETU of Incomer Breaker

## Dynamic Motor Starting and Relay Coordination for ADNOC



The purpose of this study report is to check the adequacy of existing electrical equipment including Transformers, MV/LV switchgears, and power cables. Largest motor starting due to the additional/replaced loads for this project scope of services. Main Scope:

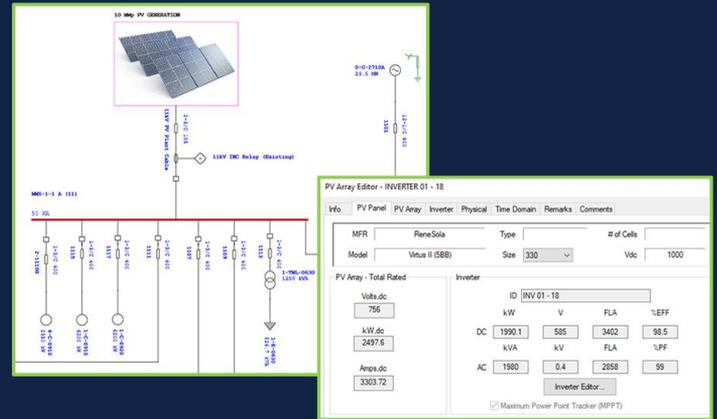
- Dynamic motor Starting
- Protection Settings

# Important Reference Projects

## ENI Bhit Field Phase 2, 10MWp PV Plant Extension

The scope is to carry out a study of the electrical system, which includes new PV plant network interconnected to the existing electrical network at 11kV. Following studies have been conducted at 10MWp PV plant, Bhit Field Phase 2, ENI Pakistan :

- Load Flow Study
- Short Circuit Study
- Relay Coordination Study



## Offering Power System Solutions tailored to fit the needs of:

- Transmission utilities
- Distribution utilities
- Power generation companies
- EPC contracting and construction companies
- Oil & Gas industry
- Metals & mining industry
- Chemicals, cement and fertilizers industry



## Simulation Tools:

To address more complex networks for sophisticated electrical studies with precise and optimum design, highly specialized reputed design software with right expertise is required. FIC Engineering uses the following well reputed software for conducting the system studies as per customer needs.

**PSCAD:** Electro Magnetic Transient analysis package for performing insulation coordination, NGR design, special protection relay (like distance relay) behavior analysis and over current relay protection coordination and Power quality assessment study.

**ETAP:** Load flow, short circuit, motor starting, transient stability studies, relay setting calculation/coordination study, load shedding analysis, Arc Flash Hazard Analysis, Harmonic Analysis and Automatic Bus Transfer studies.

**PSS/E:** Load flow, short circuit, protection review and dynamic studies for utility networks.